

**An automated multi-function desk for use in a post office****Description**

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This invention relates to an automated multi-function desk for use in a post office.

Postal employees are put under stress by the number of repetitive operations they perform. Despite common knowledge the more frustrating operations deal not with physically manipulating object to be delivered, but with the boring operations to look for writings and symbols placed on postal delivery. It is even more frustrating to read and write data concerning about delivery characteristics such as weight, stamp value etc. Queues or lines in post offices, comprising people waiting to interact with a postal employee, are commonplace, and are generally disliked by all concerned. The delay in being served is a potential source of frustration and annoyance to customers. An annoyed customer may take issue with, or even threaten the postal employee who he eventually meets for service.

Whilst some of the people waiting in such queues require a postal employee to carry out a relatively complex and involved service, many people only require basic counter services.

A common place to all these customer are basic operation of checking the delivery, looking for information on the sides of the delivery, weighing it, rereading and inputting the information in a device etc. etc. These operations become evenly boring both to the postal worker and to the customer.

Accordingly, it is a general object of the present invention to overcome or at least mitigate the problems and shortcomings associated with the post offices as identified above. According to a first aspect of the invention there is provided an automated multi-function desk for use in a post office, comprising a processor electrically coupled to each of: an input device operable by a user, a device for weighing items of postage, a device for capturing image, a visual display; the processor being configured to: (a) receive input from weighing device specifying the weighing of an object placed thereon; (b) receive input from image capturing device of an object placed thereon; (c) receive input from the input device specifying other necessary characteristic of the delivery; (d) process the image information in order to recognize dimensions, writing characters and/or symbols from the electronic image captured previously; (e) provide output to the visual display to show image, dimensions, writings and all recognized characteristic from the object placed thereon; and (e) operate the output device to supply storage of retrieved information for further operations such as printing, showing analysing etc.

Preferably the said output device is adapted to dispense the images captured from the postal delivery.

Preferably the automated multi-function desk further comprises an output device adapted to dispense a label with the elaborated data resume determined by the automatic reading and processing of image and weighing from the device.

Preferably the said output device is adapted to dispense postage stamps which value is determined by the automatic reading and processing of image and weighing from the device.

Preferably the said output device is adapted to print and dispense franked postage labels which value is determined by the automatic reading and processing of image and weighing from the device.

Preferably the said output device is adapted to print and dispense a shipping label which terms are determined by the automatic reading and processing of image and weighing from the device.

Preferably the payment acceptance device comprises a cash acceptance and discrimination device.

Preferably the automated multi-function desk further comprises an output device adapted to print and dispense a payment receipt which value is determined by the automatic reading and processing of image and weighing from the device.

Preferably the visual display is a low thickness, touch sensitive (LCD, FLCD, OLED etc.).

Particularly preferably, the processor, the input devices, the weighing system, the visual display, the payment device, and the output devices are connectable in different units within the post office local or global network.

By removing the need for the employee to turn the postal object, to read and digitise data such as weight, stamp values, addressee etc. it is reduced the probability of errors in expeditions and charges. The employee has the function to control the data and the customer itself, through the display unit could check and aid the employee in its simpler and more effective role of controller instead of being frustrated by not participating to the operation on its own postal deliveries.

Embodiments of the invention will now be described, by way of example, and with reference to the drawings in which: Figure 1 illustrates a section front view of an automated multi-function desk for use in a post office, in accordance with the invention; Figure 2 illustrates a top view from above of the automated multi-function desk shown in Figure 1; Figure 3 is a procedural flow diagram illustrating a user's interaction with the automated multi-function desk; and Figure 4 is a system architecture diagram illustrating schematically the interconnection of principal components of the multi-function desk, and its connection to a telecommunications network.

An example of an automated multi-function desk in accordance with the invention is illustrated in Figures 1 and 2. The multi-function desk integrally comprises a working plane 50 having supports 60 mounted on a frame 30. The post office desk 20 supports the system trough frame 30 or directly trough supports 60. Supports 60 have the characteristics to act as load cells, in case the frame 30 or the working plane 50 could work as load cells, too.

An image-capturing device 10 is suspended below the working plane 50 with positioning elements 70. The image-capturing device 10 has capability to regulate the distance from the working plane 50 by

itself or through the modification of geometry of positioning elements 70. This function is needed to guarantee proper view angle and image quality for the object 40 on the working plane 50.

The working plane 50 is made of transparent material in case image-capturing device 10 is mounted on the opposite side of the working plane 50 in respect of object 40, it could be opaque if image-capturing device 10 is mounted on the same side of the working plane 50 in respect of object 40.

To reach the best performance of the automated multi-function desk two image-capturing devices 10 could be mounted in the device, one for each side of the working plane 50; in alternative working plane 50 could be realized movable (for example could be rotated while the object is kept in position by suitable stoppers).

Image-capturing device 10 could be positioned aside of the device looking in transversal direction with a mirror or prismatic device directing the light rays coming from the object 40 to the image-capturing device 10.

In Fig.2 is specifically represented an object such as a mail delivery. The load cell 60 displaces the working plane and gives a signal (analogue or digital depending on the mounted device) proportional to the weight of object. The image-capturing devices 10 capture an image of the object. In order to facilitate analysis of the dimension of object 40 a reticule 100 or similar is included in the image. The reticule 100 divisions are of known dimensions, the reticule 100 could be signed or drawn directly on working plane 50, projected through illumination system or superimposed even temporarily by a software function.

Processing the image identifies specific areas on object 40. These areas are for example stamp area 80, address area 90 etc.

In specific identification of stamp area 80 allows analysing stamp image and correlating with stamp database through apparent colours, sub-area colours etc. in order to retrieve stamp value and validity. The retrieved information allows calculating the paid fee. The same functionality could be used in case not stamps but other marking, such as fee value marks are printed directly on documents.

More variable area are the addressee areas 90 (sender, receiver) from both side of the documents, these areas contain specific information concerning the origin and the end of expedition such as (country, city, address, name, family name and ZIP codes). Actually character recognition is not perfect for words if the nature is generic, but a good improvement is possible if an union with a supporting database of locations and codes is available to refine the OCR in case of ambiguity: more specifically if ZIP code is present it is known that number recognition is better performed and much more easy than alphabetic characters.

Other information could be image-captured and recognised such as: the presence of a air-mail stick,

the presence of a priority or special issue stick, the marking of a field within a pre-stamped form or marking indicating assured expedition etc.

With the all the relevant information acquired by the multi-function desk devices as described above it is possible to propose to the postal worker the fee to be paid according to weight, dimensions and route of the postal object. As second advantages any ambiguity and inconsistency of the postal object 40 could be identified pointed out both to the employee and to the customer in order to allow a contextual triple check of the mailing procedure.

It will be appreciated that alternative configurations of these components may readily be used to implement the invention. In particular, the components need not be integrated in a single unit, but may exist as separate components, provided for an employee's/customer's use within a post office environment.

Turning now to each of the components in turn:

In a preferred embodiment of the invention, the image-processing unit is a CCD device with definition capability of at least 200 pixel per square inches, this definition demonstrated to be the minimal in order to capture the image allowing further efficient and correct processing.

Colour resolution is not mandatory, but it facilitates the identification of marks, stamps, sticks, and others.

A CMOS system could be used instead of CCD system allowing economical advantages but requiring more image elaborations. However, it will be appreciated that alternative image-capturing units having similar functionality may be used instead.

Under the control of the internal processor, a plurality of postage and delivery options are displayed on the screen, the options elaborated by the system through the data acquired by the multi-function desk being put in evidence and accepted if everything is correct by a single employee's action like a push button on a touch-sensitive screen or a key board or a mouse or a pad. These options are, for example, the destination of the delivery, the class or category of postage, whether air mail or surface mail is required, whether certified recorded delivery or special delivery is needed, and so on. All the options that would conventionally be offered to a customer by a postal worker may be represented by on-screen icons in such a manner, with data automatically recognized by the system highlighted. If some erroneous information, unrecognised the multi-function desk reports area, void in information retrieval etc., the relevant image part or corresponding icon is marked in red and shown to the employee/customer.

The employee is simply required to touch on the screen or push the keyboard or use the mouse in order to select an option of their choice, input a correct data or accept the correction from the system and save the data in the local or network database. An option may also be provided for the user to input the delivery

address, for printing onto a shipping label as will be discussed below.

A conventional non-touch-sensitive visual display unit may alternatively be used together with employee/user input means such as buttons or a keyboard.

The postage cost in respect of the delivery option produced by the multi-function desk or selected will depend on the weight and all other information as described above from the item of mail being sent. The evaluation has been performed as described above by the processor that calculates the appropriate postage charge and checks its conformity with the information available from the multi-function desk.

A variety of payment options are offered to the customer and connected to the device directly or through a network. A payment card reader may be provided to read credit or debit cards, which may be inserted via the slot or in alternative the card could be put on the working plane 50 and the activation of a specific function allows for the reading of card type, code and from the backward image-capturing device for the signature of the customer to be compared with the signature made by the customer on the receipts. Alternatively, for those customers wishing to pay by cash, a cash acceptance and discrimination device may also be provided. This comprises a slot for the acceptance of coins, and a second slot to receive notes or bills. Discrimination devices, as known to those skilled in the art, are provided behind these two slots.

With respect to the payment card reader functionality, the multi-function desk may be permanently connected to a telecommunications network such that the payment card reader may transact with the appropriate banks or credit card companies in a fully automated manner.

Once the payment has been effected, the postage in form of a stick is then dispensed from a specific terminal embedded with the multi-function desk or via the network connection through the usual terminal via the output slot of the postage dispenser within the post office, or manually by the employee reading the needed amount and having the payment procedure approved for the customer.

The dispenser may take one or more of a variety of forms. At its simplest, the dispenser may be a conventional stamp dispenser, dispensing postage stamps by way of a continuous ribbon of stamps, with perforations separating each stamp such that the customer may detach them. Alternatively the dispenser may issue custom-printed stamps, franked postage labels, or shipping labels featuring the delivery address (as previously read by the multi-functional desk or inputted by the user) together with an indication of the postage charge having been paid. Direct franking onto an envelope or parcel is also possible.